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FINDING BALANCE IN THE EDUCATIONAL SYSTEM: A PROBLEM- BASED LEARNING EXPERIENCE

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ABSTRACT: In the early 1990s the faculty of Forestry and Environmental Management became aware of the inability of students to integrate what they had learned and their inability to apply it (Zundel et al., 1994). Industry was telling them that they required graduates that were good problem solvers. At about the same time, faculty members were reading a book entitled *Educating the Reflective Practitioner,* by Donald Schon. The book suggests that professionals should be engaged in a process of thoughtfully doing things or reflection-in-action. As a result the faculty became interested in problem-based learning.

Problem-based learning was attractive because students learn by engaging in a process of concrete experience, reflective observation, abstract conceptualization, and active experimentation. Students are given a carefully prepared "presenting problem." Presenting problems are ill-defined, opened-ended problems that lack concrete information. Once the students have the problem, they analyze the problem, define needed information, identify new knowledge, and apply the new knowledge to solve the problem. As they are doing this they are building their expertise in problem solving and building teamwork skills.

Problem-based learning was implemented across the five-year curriculum. The students hated it. For a number of years the students appeared confused, disoriented, and angry. They complained that the problems were insurmountable and that they lacked the resources to find solutions to the problems. Academic and emotional support was provided to encourage students to succeed. The grievance process model was introduced so that students could understand why they were feeling the way they were, to show there was light at the end of the tunnel. Though many students adapted quickly to the new approach to learning, some were simply unwilling to cope with the new approach to learning and the difficulties associated with it.

As a result, the faculty adopted a simplified educational model to try to understand why students hated problem-based learning (Needham and Zundel, 2000) (Figure 1).

Figure 1. Simplified Educational System Model

Characteristics of each of these components were examined to help understand the problem. Characteristics identified within each component consisted of the following:

Student: educational background, maturity level, and type of previous learning approach.

Program: presenting problem, class sizes, skill level of faculty, quantity and the quality of available resources, and quality of feedback.

Outcomes: the professional, technical, and attitudinal outcomes desired.

It was found that our expectations of our students were entirely realistic. The model we had implemented was appropriate for highly motivated, exceptionally smart students. This represented perhaps twenty percent of our total student population. As a result of this investigation many aspects of the delivery of problem-based learning were modified to fit our needs and circumstances. I am presenting only one of the modifications that were made.

The presenting problems in our first-year freshman course were modified to be less open-ended and ill-structured. The nature of the problems was also modified to be more technical so that there was much less ambiguity for the student to struggle with (Figure 2).

In 1994 the student would spend time struggling to determine what was meant by value. Students would be engaged in defining value, learning what value meant, from whose perspective, and how it could be measured. Although there was feedback and interaction along the way, the students final report was due two months after it was initially given. The presenting problem in 2001 was much different. It emphasizes technical skill development and does require the same amount of questioning to determine a practical solution. The duration of the project is also significantly less than the initial presenting problem.

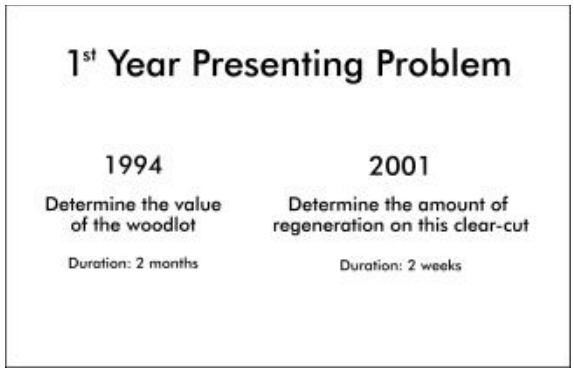

Figure 2. First-Year Presenting Problems from 1994 and 2001

As a result of this change and others, the program is much better balanced. Students are not experiencing the same levels of stress, yet are still meeting our targets for technical outcomes. But are there consequences to our initial 1994 and 2001 objectives?

There is a possibility that students are not as comfortable in the attitudinal outcomes. They may not be as compe-

tent at handling high levels of stress, coping with change, taking the initiative, and learning on their own as graduates from the first years of problem-based delivery. There are no concrete data to support this belief at the moment, however.

If you are considering or have already implemented problem-based learning in your program, I suggest adopting this simplified educational model and examining the characteristics of the three components carefully. Realize that a modification to any of the components impacts the other components and should be considered for such impact before being implemented. Also, keep in mind that there can be hidden trade-offs to changes that may be as important to the success of the students as some of the defined outcomes you are striving for.

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